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OUR
HOME
IN THE
STARS

> “In My Father’s house are many mansions: if it were not so, I would have told you. I go to prepare a place for you.”
>
> *John xiv. 2.*

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OUR

HOME IN THE STARS.

BY

JOSEPH DREW, LL.D.,

ETC.

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ARGUMENT.

The sublimity of the subject—The magnitude of the stars—The eternity of matter—The eternity of time—The infinity of space—The mission of the stars—The magnitude of the universe—The planetary systems—The Mosaical account of the creation of the sun, moon, and stars—Moses well versed in all Egyptian lore—"The greater light to rule the day, the lesser light to rule the night; He made the stars also"—The stars not made for the illumination of the earth—Heat, light, moisture, and electricity necessary for the sustaining of life—The constituents of the planets—Do the planets contain the necessary conditions for the support of life?—Is life dependent on electricity for its development?—Experiments made on the bodies of criminals—Miniature worlds produced from strange materials—Matter and life inseparable—The oceans and continents in the planet Mercury—The mountains and seas in Venus—The distribution of land and water in Mars—The asteroids fragments of an exploded planet—Jupiter the Goliath of the heavens—Saturn and its moons—Uranus and Neptune—All these planets hold within themselves the conditions necessary for the support of life—Where these conditions exist life must be abundant—The inhabitants of the planets—Telescopic and microscopic worlds—The seven heavens—The seven planets—Abraham entertaining the angels—Are angels a distinctly created race?—Was there not a race previous to Adam,—sinless, therefore deathless?—To what sphere did the angels who visited the patriarch belong?—They were material beings—They must have had a material home—Scriptural evidence in favour of the stars being inhabited—May not our happiness be progressive in other worlds?—"In my Father's house are many mansions"—"One star differeth from another star in glory"—Isaiah, Nehemiah, and St. John support the theory of the habitability of the stars—On what star shall we find our future home?—What new scenes of beauty shall we meet with in those glorious climes?—The strongest argument in favour of a material heaven in our Saviour's own declaration, "Verily I say unto you, I will not drink henceforth of the fruit of the vine, until that day when I drink it with you, in my Father's kingdom."

OPINIONS OF THE PRESS.

"Our Home in the Stars" was the subject of a most eloquent lecture, delivered at the Institution Hall last evening, in connection with the Mutual Improvement Society, by Joseph Drew, Esq., of Weymouth. E. Raymond, Esq., occupied the chair, and the attendance was larger than it usually is at lectures delivered in this town. It is simply impossible, in the limited space at our command, to convey a clear notion of the intellectual treat which Mr. Drew provided for his audience on Thursday evening. The subject chosen was one of the grandest that could engage the human mind—a subject upon which the master spirits of all ages have expended their thoughts. When it is added that many of the leading discoveries of astronomers, from the time of Thales to the present day, were laid before the audience, clothed in the choicest language, some faint idea of the range and beauty of the lecture may be gathered. A vast amount of information was conveyed without the infliction of a long list of technicalities, but whilst those ignorant of astronomy could scarcely fail to follow the learned lecturer with delight, the discourse was one that those more deeply versed in the mysteries of the science might have listened to with very great pleasure. Every sentence was a word-picture; and in many parts the composition would compare most favourably with the brilliant scientific expositions of Sir William Herschel, Dr. Chalmers, or Lord Brougham. The majestic grandeur of the principal heavenly bodies, the matchless beauty of the myriads of stars, the wondrous order of the solar system, and the undefinable majesty of creation generally, were themes which called forth the learning of the lecturer, and the frequent applause of the audience. Many persons will probably dissent from Mr. Drew's hypothesis that our future home will be in the starry world; but all who listened to this brilliant lecture on the subject will admit that he adduces many and weighty reasons in support of his theory, and that his treatment of the subject is most learned, eloquent, and devout.—*Western Gazette.*

"In language of the choicest and most elegant character, yet perfectly devoid of technicalities and uncertain phraseology, Mr. Drew introduced his audience to the mysteries of astronomical science, and showed the perfect harmony existing between reason, revelation, and science. His appeals to Scripture were reverent and most appropriate."—*Central Somerset Gazette.*

"Mr. Drew then entered upon the lecture, and willingly enchained, as with an invisible thread, the attention of the audience. It was a truly eloquent and masterly composition, and was delivered with great clearness and force."—*Weymouth and Portland Guardian.*

OPINIONS OF THE PRESS.

"We feel that it is quite beyond our power to convey to those who were not present any idea of the lecturer's impassioned eloquence, florid and graceful composition, and peculiar and powerful arguments. Mr. Drew's forte is evidently to place scientific knowledge in a simple yet fascinating manner before the minds of the people, and to lead them to think for themselves. We hardly know which to admire most, the earnestness with which the lecturer sought to reconcile the word of God with science, the charm with which he invested theories the most fanciful, the enchantment which he seemed to throw round his audience, or his own unassuming manner. Mr. Drew has not only done much to raise the standard of public lectures, but has disproved the assertions made again and again of late, that if good lectures are provided the people will not go to hear them." *Somerset and Wilts Journal.*

"Mr. Drew clothed his ideas in most elegant language, and supported them by telling facts, with constant and reverent appeals to Scripture. His lecture was listened to with great pleasure, and a cordial vote of thanks was given him at the close."—*Weymouth and Portland Telegram.*

"To say that the audience was interested would but faintly express the real state of their feelings; they were delighted and most enthusiastic in their manifestations of admiration, and at the close the audience rose *en masse* to do honour to Mr. Drew." —*Somerset and Wilts Journal.*

"The diction of the lecture was exceedingly fine, even at times reaching a strain of poetry, while the striking vein of thought which pervaded the whole gave an impression of great originality and research."—*Southern Times.*

"The sublimity of thought, the grandeur of conception, and the elegant language, combined with conciseness and simplicity, made the lecture such an intellectual treat as seldom falls to the lot of a country audience to hear."—*Yeovil Flying Post.*

"We cannot say too much in praise of the beautiful language, the eloquent pathos, the deep scientific research, and the bold, but reverent speculations, which made up Mr. Drew's discourse."—*Shepton Mallett Journal.*

"The extensive reading and careful thought, and the choice and elegant diction, were all quite as evident in this lecture as in that delivered at Crewkerne."—*Pulman's Weekly News.*

"We are sure those who were present will not soon forget the rich intellectual food that was provided for their future contemplation."—*Dorset County Chronicle.*

"The lecture was full of rich imagery and poetical feeling, and the various theories were each advanced upon some Scriptural basis."—*Poole Herald.*

"Whether regarded as a piece of composition or as a popular scientific discourse, it was a masterly performance."—*Western Gazette.*

PREFACE.

THE subject of the following pages was delivered as a lecture—one of a series of twelve—before the members of the Weymouth Mechanics' Institution, on the evening of October 8th, 1867, and subsequently given gratuitously in nearly all the towns of Dorset, Hampshire, Somerset, and Wilts, in behalf of the funds of their various Educational, Literary, and Scientific Institutions.

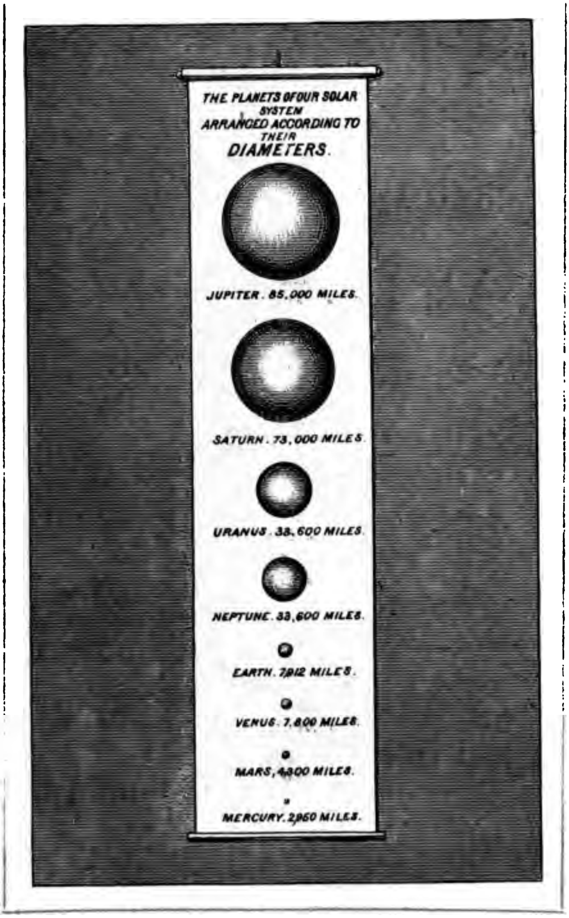
At the request of several of the committees of these societies I have now consented to publish "Our Home in the Stars" in an enlarged form, and trust it will not only prove acceptable to them, and interesting to the general reader, but that it will awaken in their minds a desire to become better acquainted with the sublimity and grandeur of those celestial orbs, whose various characteristics I have so faintly endeavoured to describe.

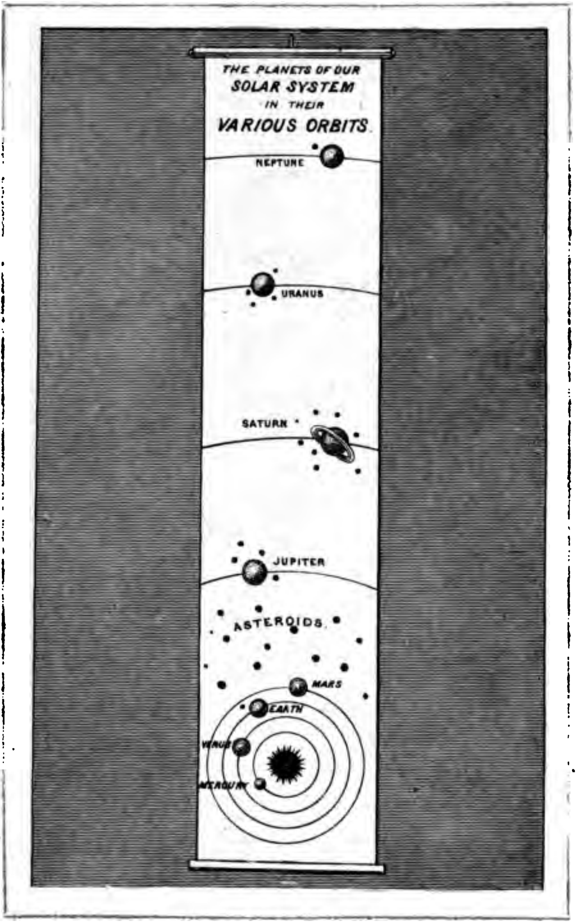
The subject of a plurality of worlds is by no means new. The earliest mention, however, of this theory, that we can trace, is in a small work written by M. Fontenelle, in 1686, whilst he was Secretary to the Academy of Science in Paris, and so popular did this treatise become that it was translated into all the languages of the Continent. Subsequently, Huygens—the contemporary of Newton—published a work entitled "The Theory of the Universe; or, Conjectures Concerning the Celestial Bodies and their Inhabitants," which was also translated into English, and ran through two editions. These two works appear to be the only early volumes expressly written upon the habitability of the planets; but the doctrine of a plurality of worlds has been supported by the greatest thinkers of every age. Bruno, Kepler, Tycho, Newton, Dr. Bentley, Laplace, Sir W. and Sir John Herschel, Dr. Chalmers, Isaac Taylor, and M. Arago have each expressed a decided opinion in favour of the planets being inhabited worlds. In 1862 Sir David Brewster published a work under the title of "More Worlds than One," in which he contends for the habitability of the planets with an earnestness and power which conviction alone could evoke. Sir William Herschel also entertained the same opinion; and lately Mr. Proctor, F.R.A.S.—whose popular astronomical writings are so highly appreciated by the students of celestial phenomena—has also produced a volume entitled "Other Worlds than Ours," in which he elaborates in a more scientific manner the physical character of our planets, without venturing too far on the "debatable land" of their being the abodes of life.

The interpretation given to certain portions of Holy Writ in support of my argument I hope will be accepted as suggestive only, having no desire to interfere with any one's faith or the views taken by Biblical commentators, although in many instances these are as wide as the poles are asunder, the only object of this lecture being to place a little scientific knowledge, in a popular form, before those unacquainted with the rudiments of astronomy, and to endeavour to work out a favourite hypothesis—which I have long entertained—that our planet, the Earth, now occupied by the human race, is only one of the many resting-places in our journey onwards, and that the inhabitants of the planets of each solar system will ultimately be gathered together into one abode, for some wise and beneficent purpose beyond our finite judgment to comprehend.

J. D.

Belgrave Terrace, Weymouth,
January 29*th*, 1872.


THE PLANETS OF OUR SOLAR
SYSTEM
ARRANGED ACCORDING TO
THEIR
DIAMETERS.
JUPITER. 85,000 MILES.
SATURN. 73,000 MILES.
URANUS. 33,600 MILES.
NEPTUNE. 33,600 MILES.
EARTH. 7912 MILES.
VENUS. 7,600 MILES.
MARS, 4300 MILES.
MERCURY. 2960 MILES.


THE PLANETS OF OUR
SOLAR SYSTEM
IN THEIR
VARIOUS ORBITS.
NEPTUNE
URANUS
SATURN
JUPITER
ASTEROIDS.
MARS
EARTH
VENUS
MERCURY

OUR HOME IN THE STARS.

THE subject we are about to discuss in the following pages is one of such sublimity and grandeur, that we feel impressed with our want of descriptive power to place it before our readers in language sufficiently lofty to be worthy of such a theme.

If on our own planet, where science has developed its past history and experience has reduced its future to a certainty, we are lost in admiration as we contemplate the wonderful and marvellous arrangements of Providence—the mysterious working of nature—the startling geological changes—and the high and important destiny of our race—how much deeper in amazement are we plunged when we direct our attention to those myriads of glittering stars with which our firmament is studded—examine their magnitude and weight—and reason on their probable mission in the Great Architect's design.

The eternity of all things, and yet all things undergoing change, is a subject few care to investigate. The eternity of matter, the eternity of space, the eternity of time, and the eternity of thought, are subjects beyond the comprehension of the masses, who view such questions as mere flights of the imagination, only to be indulged in by those who are not engaged in the stern realities of the battle of life. But we look upon these and kindred matters as the recreation ground of thought—ambrosial food for the refreshment of weary minds—shady nooks in the scorching up-hill journey of life—friendly trees in the broad savannahs of daily toil—where men may rest and recruit their minds with thought.

But not all minds can grasp even a simple mathematical problem, and how few there are that ever master the higher mysteries of that delightful science; nevertheless, to those few, the contemplation of the starry worlds, their distance, size, and motion, with all the astounding theories and truths that result from such investigations, are intellectual pleasures, which approach nearer than any other human enjoyment, to that "feast of reason and flow of soul" found in the poet's dream and the impassioned lover's song.

Accustomed from our infancy to view the heavens under every phase of atmospheric influence, their gorgeous array of beauty has failed to excite wonder or create surprise.

We watch the early sun as his glorious orb ascends above the horizon, his chariot of cloud and steeds of fire, dashing aside the grey-eyed morn and filling the broad expanse with floods of amber light. We see his rays play o'er the distant hills, and crown the lofty peaks with tiaras of liquid gold; but, we have observed the same before, and the scene fails to make any new impression on our minds.

We view the queen of night careering through the heavens with refulgent beauty, scattering silver flowers upon the placid sea, and pearls upon the rippled sands; her car attended by myriads of planets—the bright flambeaux of her train; but, from childhood she has been familiar to us, and we fail to see wonder or beauty in what is common to the observation of all.

We gaze on the star-lit heavens, and watch the meteor pass, or the shooting star fall, the moon's eclipse, or the changing form of the northern lights; but to-morrow we may see the same, and we cease to wonder at their beauty.

But let science remove the scales from our eyes, and lift the pall of ignorance from our minds, and we at once recognise the grandeur and the magnificence of the heavens. What bright vistas of imperishable glory are immediately opened up for our contemplation! Those rolling worlds and glittering atoms that congregate through the fields of space, begin at once to fascinate our minds and arrest our attention, and we feel desirous to know more of their secret history and their use.

Now, accepting the generally received admission that there can be no limit to space, let us endeavour to conceive some idea of the magnitude of the universe by which we are surrounded. Follow us in thought, as we traverse its illimitable fields—take with us the wings of the morning and fly to the nethermost part of that ethereal vault, upon the bosom of which those shining spheres recline, and we shall there find that myriads upon myriads of miles have brought us no nearer its confines. Fly with the speed of thought through its immensity, for myriads upon myriads of years, till figures fail, and man is lost in calculation, and even then we are no nearer its verge. There we should see precisely what we behold here—stars and planets, suns and systems, powdering the azure dome—fixed stars, a million times larger than our earth, studding the sky, and all working out their destiny as worlds, with the same order and precision as the planets of our own system. Still further on, piling myriads upon myriads of miles through countless ages of time, and we should find the same, those "morning stars," which sang for joy when God created the heavens, are there, rolling on in space like our own. Away, away, again, through interminable time, still on and on, through indefinite space, and all is the same. Suns, moons, and planets, stars, and constellations float in the still distant sky, and all the celestial phenomena that characterize our own strata of the universe, there exhibit the same glorious phases of beauty—there those double stars and wandering comets—there those brilliant coloured suns, emitting ruby and emerald fires—there the shooting star and lunar bow, electric flames, and cloudless sky, excite the admiration and wonder of the inhabitants of other worlds, far too distant to come within the range of our restricted vision.

At such distances, indeed, are some of these starry worlds, spread through the fields of space, that the light of millions, though travelling at the rate of thousands of miles for every second of time, will ever fail to reach this globe, even though it should endure for ages, beyond the utmost calculation of man.

However extraordinary these statements may appear to those who have not dwelt upon such subjects, they are, nevertheless—if we accept the illimitability of space, as we are bound to do—not only true, but may be considered as very faint indications of the immensity of Creation. The most sober-thinking man, the most profound philosopher, is bewildered when he tries to grasp, even in thought, the immensity of space; and no writer, however logical his mind, has yet conveyed, by analogy or otherwise, any adequate or satisfactory idea of that infinity of distance through which those brilliant orbs perform their allotted course. Are we, then, to suppose that those millions of rolling spheres, those magnificent systems of brilliant suns and monster planets, those shining stars and glittering orbs, were created for the mere purpose of lighting this little world? Science and common sense forbid our entertaining such a simple idea, and it will now be our pleasing duty to place before you a few facts why we arrive at a contrary conclusion.

In the first place, if we refer to the Mosaical account of the Creation, we shall there find that God said "Let there be lights in the firmament of heaven, to divide the day from the night, and let them be for signs, and for seasons, for days, and for years. * * And God made two great lights, the *greater* light to rule the day, and the *lesser* light to rule the night: He made the stars also."

Here, then, we have a distinct and unequivocal assertion that the sun was made to rule the day, and the moon was made to rule the night: there is no mention of the stars being made to light the earth; but, as they were creations of the same class and the same order, Moses adds, "He made the stars also."

The sun unmistakably rules the day. The revolution of the earth round its own axis produces what we call "sunrise" and "sunset," whilst its revolution round the sun itself secures to us all the change and variety of the seasons.

The new and full moon, her decline and eclipse, are the signs by which we notify many events, and by which we are also assisted in many of our astronomical calculations. It is, therefore, the moon and the sun that are for signs and for seasons, for days and for years, and in these duties the stars have no part to perform.

Had Moses intended to convey to us that the stars were to assist in lighting the earth, he would not have been so particular in using the singular number. Moses, though no orator, was nevertheless a very clever man, and, as the adopted son of Pharaoh's daughter, he was educated by the most learned men of Egypt. He was our earliest historian, and although Aaron was his "mouthpiece" to the people, still, as Moses was taught of God, the language of inspiration must always be elegant and correct. He was also a good logician and a scientific man—so far as Egyptian lore could teach him—consequently you would not find him wrong on such an important subject as the history of the Creation. He says, "The *greater* light to rule the day, and the *lesser* light to rule the night;" but, had the stars been created for the same purpose as the moon, Moses would have said "the lesser *lights* to rule the night," and thus by using the plural he would have set all discussion at rest; but he speaks of the stars as a distinct Creation—"He made the stars also."

We do not intend, however, to investigate the general character of the heavens, but confine our remarks more exclusively to the planets of our own system; and as we shall have to reason occasionally from analogy, and sometimes to draw our conclusions from circumstantial evidence, instead of from direct proof, we propose to take for the basis of our argument the various conditions we find in our own planet—the earth—for the propagation and support of life.

Animal and vegetable vitality is dependent upon four natural causes for its existence—viz., heat, light, moisture, and electricity.

Our common fount of light and heat is the sun, and, at the distance of *ninety-one million six hundred thousand* miles from this central fire, our earth revolves upon its own axis every *twenty-four* hours, and travels round the sun every *three hundred and sixty-five* days.

Now, in order to support life, it is also necessary that the heat and light should to a certain extent be uniform in their action, and this is accomplished precisely in the same way as a joint of meat is roasted before a fire. The meat is made to revolve, and the result is that every portion of the joint receives a certain amount of warmth. So with the world and the other planets: as they revolve round their own axes and the sun, so their crusts are periodically submitted to its influence.

The earth is enveloped in an atmosphere which extends upwards for about forty-five miles; the nearer the surface the more dense the atmosphere becomes, and there, like a mantle, it gathers and preserves the heat for the propagation and support of animal and vegetable life.

The earth itself is diversified by land and water, mountain and valley, hill and dale, sultry climes and eternal snows. Animals and plants, flourishing in one portion of the globe, perish if suddenly removed to another; it would require centuries to acclimatize them, and then, in all probability, their physical structure would be materially altered to suit their new condition or circumstances. We have clouds and storms, fog and dew, summer's heat and winter's cold, soft balmy breezes and destructive hurricanes; and yet all these conditions are absolutely necessary for the promotion and continuation of vitality.

Without light we should have no colour, all nature would blanch and become spectral; without heat we could have no evaporation, without evaporation we could have no clouds, without clouds we could have no rain, and without rain all living things must die; and yet, see how obedient the elements of life are to these conditions. Not one inch of soil, not one drop of water, but is teeming with life—our very rocks contain the remains of things that once lived; many are entirely composed of the stony skeletons of minute organisms that once held their home in the sea, or upon the earth—in the dark caverns of its crust, down into its deepest fissures and mines—in the fathomless depths of the ocean, where the "deep sea lead" has failed to reach—on the mountain top—amid the regions of eternal frost—in the air we breathe—in the water we drink—there is life, life everywhere and in every-thing, and it is a positive law that under these various conditions, animal and vegetable life must exist.

Heat, moisture, and light will produce miniature worlds from very strange materials. A few freshly gathered leaves thrown into water for a few days and placed in the summer's sun, and the result will be an animalcule ocean; a heap of dust or a decaying bone is an embryo world; all animal and vegetable remains, as they decompose, and resolve themselves into their primary elements, people their vicinity with creatures which, although microscopic, nevertheless perform all the functions of existence as perfectly as the giant of the human race.

From the creeping speck to the crawling worm—from the worm to the noble lion—and from the lion to its lord and master, man—each and all are dependent alike on these conditions for their existence on the earth.

In speaking of animal and vegetable life, we take the term life in its broadest acceptation. In animals the faculty of moving, the exercise of the senses, the gratification of the desires, are acknowledged proofs of existence. In vegetables the power of producing leaves, flowers, and fruit is also accepted as indicating vitality; but we believe that all these indications—all these powers—are dependent upon a primary cause, the circulation of the blood in animals and the sap in plants, is dependent upon that mysterious fluid, electricity. Nature is full of this subtle agent, from the sun's photosphere to those fibres and veins found in the earth's crust—branching out like metallic trees—there is a continuous chain, no link is wanting. The iron found in the oak, and the phosphorus in our bones, the action of the brain, and the nervous system, are alike dependent upon its influence. When the air becomes overcharged, its excess is expended in lightning; when the earth becomes surcharged, its surface is rent, and cities topple to ruin. The "mesmerist" and the "clairvoyant" are its children, and the maniac its victim. The world itself is a gigantic battery, continually furnishing the necessary supply for all the smaller instruments throughout its crust; man's brain is the battery for his individual existence, and his nerves are the telegraphic system of the body; and this applies to all animal economies. It is not the want, however, of electricity that occasions death, but a disarrangement of the system, whereby its conducting powers are dislocated and thrown out of gear—it is not the breaking down of the apparatus or a destruction of the cells, but a physical alteration in our system, antagonistic to the healthy action of this vital fluid, which frequently causes death.

Our knowledge of electricity, however, is very limited—indeed the science itself is in its infancy—we know that it conducts the mariner over the trackless paths of the ocean—that it assists in producing light and heat in the sun's photosphere, and gives us that beautiful phenomenon, the aurora lights—that its illuminating power is the highest we have yet discovered—that its heat is more intense than that of the blast furnace—that we can collect it and make it obedient to the will for conveying our thoughts from one hemisphere to another, and yet we are entirely ignorant of the nature of its elements, the secret of its mysterious source, and its inscrutable workings. Omnipotence says "Thus far shalt thou go, but no farther." We, His creatures, are permitted partial glimpses of His wonderful power and glory, but the full radiance is reserved until that day of disclosures, when—in the light of His countenance—we shall behold the light of His ways.

What lofty thoughts—what ennobling ideas of the Creator's wisdom—do these comparatively trivial matters give us! What knowledge of His power, His love, and His omnipotence, do these exhibitions impart to us, if we will but investigate their action and appreciate their beauty!

To test the action of electricity on animals recently deprived of life, several experiments have been made—by permission of the Minister of Justice in France—upon the bodies of criminals, immediately after execution; and, by the application of galvanism, all their muscles were put into violent motion—full and laborious breathing produced, and every lineament of the murderer's face thrown into fearful action; so that rage, horror, despair, and ghastly smiles were exhibited in such hideous combination that fainting and sickness were produced amongst the spectators.

Now, having explained from our own planet, the Earth, what elements and conditions are absolutely necessary to support life—and having shown that where these elements and conditions are present vitality must exist—we shall next proceed to the other planets and examine their constitution and character, to see how far they resemble this earth, where we find animal and vegetable life so abundant.

Taking the Sun as our starting point, we shall proceed to view each planet of our solar system in succession, as it revolves round that luminary.

The nearest recognised planet to the centre is Mercury,* and this occupies an orbit *thirty-six million* of miles distant. Its diameter is nearly *three thousand* miles, consequently it is much inferior to the earth in size; but it is equal in beauty. It has a day of the same duration as we have; but its year is only one-fourth the length of ours. This planet travels at the rate of *one hundred and ten thousand* miles an hour, and possesses oceans and continents, with mountains several miles in height; but, from its proximity to the sun, its heat and light have been calculated to be about ten times more intense than we receive from the same source.

This increase of temperature and light, however, would have no detrimental effect upon the living organisms of this planet, even supposing life to exist in the same form as here, for it has been suggested that the excess of light and heat is reduced to the same quality as our own, by a very dense atmosphere, full of vapour and cloud.

Here, then, we have all the conditions necessary for life. We have day and night, summer and winter, and, having an atmosphere, it follows as a natural result that there must be clouds and rain, sunshine and storm, gentle gales and morning dew—in fact, every requisite for the support of vitality; and, as life must be present where these elements exist, we have every reason to believe that Mercury is a planet teeming with inhabitants, if not identical, at least very similar to ourselves.

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* A French observer has lately laid claim to the discovery of a planet nearer to the sun than Mercury, occupying an orbit 18,000,000 miles from the centre, and he has named it Vulcan. Our English astronomers, however, have searched the supposed orbit in vain for an opportunity of seeing it; consequently, we commence with Mercury.

The planet next to Mercury is Venus, and well may she be called after the goddess of beauty and love—for, with the exception of the Sun and Moon, she is by far the most splendid of all the heavenly bodies. Her brilliancy is so great that she can frequently be seen in broad daylight with the unassisted eye. She is a morning and evening star, patiently and lovingly following her lord, the sun; and never, under any circumstances, can she be found in one quarter of the heavens whilst he is present in another.

The orbit of Venus is *seventy millions* of miles from the sun. She has a day of twenty-three hours and a-half, and a year of about eight months. Her size is very little inferior to the earth, whilst some of her mountains are assumed to be at least nineteen miles in height.

The atmosphere of Venus is very similar

to our own, being about fifty miles in depth; but the light and heat, diffused over its surface by the sun, are considerably more than we receive on the earth; these are supposed to be modified in the same way as on Mercury, consequently the excess would prove no inconvenience to its tribes.*

Here, then, again, we have every condition necessary for the propagation and support of life, consequently we must have the life if we have the conditions. Venus, therefore, like our earth, must be the seat of vitality, whilst all the luxuriant vegetation—change of climate—variety of seasons—mutations of temperature—and eternal change, which make up the physical history of our own globe—must be present in this brilliant sphere.

The next body we meet with in the solar system is our Earth, of which we have already given a description; but here we have the first planet from the sun accompanied by a recognised satellite, or moon, the structure and particulars of which we shall not enter upon until we have examined the other planets in our system.

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* At various times a small brilliant speck has been seen near Venus, which has been thought to be a satellite. In fact, some of the astronomers who witnessed the transit of Venus in 1761, say they distinctly saw a satellite accompany Venus across the face of the sun; but its existence is still doubted by the astronomers of the present day, as a long series of observations, conducted by some of our ablest men, have failed to show any trace of its existence.

Still travelling millions of miles further from the sun we arrive at that ruddy planet Mars.

This sphere is about half the size of the earth. It has a day of twenty-four hours and forty minutes, and a year of nearly twice the length of ours. It moves round the sun at a velocity of *fifty thousand* miles an hour. Its surface represents oceans and land; but the proportion of water to earth is very different to the distribution on our own planet. Here the division is two-thirds water and one-third land, whilst in Mars it is just the reverse, that planet having two-thirds land and one-third water.

On account of the distance of this planet from the sun, it does not receive more than half the light and heat we enjoy; but the peculiarity of its atmosphere, which—although clear—is more dense than our own—makes it admirably adapted for collecting and retaining the sun's rays, whilst a very small enlargement of the pupil of the eye would enable creatures to experience an equal amount of light with ourselves.

Mars is more mountainous than the earth, some of the most elevated mountains having their peaks covered with snow during the winter months, and this has been observed to melt when exposed to the warmth of the summer's sun.

One of the best telescopic maps of Mars, we believe, was made at Calcutta, where the clearness of the atmosphere offers peculiar facilities for astronomical observations. The description accompanying this map says, "This planet presents a world in every respect similar to our own. It has oceans and continents, which vary in shade and colour. Its highest mountains are capped with a brilliant line of snow, which disappears during the summer months. Its oceans have a peculiar green colour, and its land is tinged with various shades of red, whilst the snow line, when the poles emerge from their long winter, extends to upwards of six degrees."*

Here, then, we have another planet, holding within itself all the necessary conditions and elements of vitality. It is warmed by the same sun as ourselves—it has days and nights as we have—it has its spring, summer, autumn, and winter—it has every requisite for sustaining animation, and can we for a moment suppose that one continuous miracle is being employed to prevent life from existing, where every element necessary for its support is so abundant?

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* To those who take an interest in these subjects, we would strongly recommend the perusal of Mr. Proctor's work on "Other Worlds than Ours," in which they will find a very interesting chart of the planet Mars, and much information on the physical character of the planets of our system.

We now come to that vast space in the solar system between Mars and Jupiter, occupied by the planetoids or asteroids. Their dimensions—which vary considerably—it will be unnecessary to enter upon. They revolve at a distance of *two hundred and fifty millions* of miles from the sun, and their home may truly be called the region of desolation. Here, it is believed, some great celestial catastrophe formerly took place. Here it is conjectured that some important planet, whilst ploughing its majestic course in this orbit, was blown to atoms.

This view of its destruction is taken in preference to the hypothesis put forward by some early astronomers, that it was destroyed by coming into collision with another planet of our system. It certainly appears that the only chance of its being demolished by collision would be by striking against a condensed comet, rather than against one of our planets, and that would appear to be impossible, from the fact that we have no record of any comet with a nucleus of sufficient solidity even to disturb a planet, much less to destroy one, of the magnitude this must have been.

Had it come in contact with one of our own planets, a marked disturbance and irregularity in our system would have been detected; and this we fail to observe, whilst the contingency of a planet exploding is certainly not only within the pale of probability, but a catastrophe very likely to occur; for, were it possible to close the volcanoes of our own globe—those safety valves of the world—the effect would be that this fair planet, with all its apparent strength, its granite bones, and thews of metallic rock, would explode and be torn asunder by the mighty force of the continually engendered steam and internal gas.

It was not until the commencement of the present century that the result of this terrible convulsion was discovered; but, during the last seventy years, one by one, upwards of a hundred fragments of this exploded world—unequal in size and irregular in form—have been identified. These are the asteroids, and they all revolve round the common centre, but vary in the time of performing their journey, according to their various orbits round the sun.

These asteroids have each been named separately by their discoverers; our own countryman, Mr. Hind, having discovered several of the number, and they are called—like our other planets—after the gods and goddesses of the heathen mythology. It is now generally supposed that some of the shooting stars, and also many of those meteoric stones which have occasionally fallen to the earth in different localities, are small fragments of this same planet, wandering about in space until they are brought within the influence of the earth's attraction; and, although many doubts have been thrown upon the actual falling of these stones, still the fact has been tested beyond all question or dispute. Their identity cannot well be mistaken, as they frequently contain substances not found in the same combination in the crust of our own earth. Sometimes they fall in masses of several hundred pounds in weight, and at other times they explode in the air, with a loud report, and then fall in a shower of dust and small stones.*

An instance of one of these stones falling in the county of Dorset is recorded. During a most fearful storm of hail, thunder, and lightning, which occurred in the year 1789, a man, travelling between Lytchet Minster and Poole, observed a ball of brilliant coloured fire fall from the clouds, a few yards in advance of where he was standing, and striking the ground it buried itself some depth in the earth. Having heard something of thunderbolts, and thinking this might be one, he searched and found it below the surface. It was very hot, of a grey colour, solid, and smelt strongly of sulphur. On his return home the man—who was a servant—presented the stone to his master, and he sent it to a friend of his, Dr. Hope, of Edinburgh, for examination, and that gentleman submitted a portion of it to an analysis, when it was found to contain iron, nickel, cobalt, tin, chromium, copper, arsenic, manganese, potash, soda, sulphur, phosphorus, and carbon. The iron and nickel were in a pure metallic state, a condition in which they are very seldom discovered on the surface of the earth.*

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* This theory, however, does not apply to those periodical showers which fall in the months of August and November. The falling of these small planetary bodies has been very satisfactorily accounted for by supposing them to revolve in certain distinct orbits round the sun, and that these orbits intersect the annual path of the earth round the same luminary, so that, when our planet passes through the point of intersection, these meteorites are brought within the influence of terrestrial attraction, and the natural consequence is that they fall rapidly to the earth as shooting stars.

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* The heat of the stone would be occasioned by the friction of the atmosphere—the stone passing at such a tremendous velocity through the air would cause it to become not only red hot, but, if the fragment happened to be a small one, it would ignite, and produce the appearance we recognise in a shooting star.

Passing out of this field of devastation—leaving this "wreck of matter and crash of worlds" —we travel on to the enormous distance of *four hundred and eighty-five millions* of miles from the sun before we arrive at the planet Jupiter.

Here, indeed, we have a gigantic world. Here, indeed, we have a noble specimen of creative power. It would require about *one thousand three hundred* of our worlds to produce a globe of a similar bulk. This giant of the sky is *eighty-five thousand* miles in diameter, and is attended by four moons; but its distance is far too great for our present telescopes to thoroughly examine its surface. It is surrounded by broad belts across its disc, supposed to be produced by the dark body of the planet showing itself through openings in the brightly illuminated clouds in which it floats.

Jupiter has a day of ten hours, and a speed round the sun of *twenty-eight thousand* miles an hour; but its distance is so great that it takes nearly *twelve years* to accomplish its journey, consequently its year is twelve times as long as ours.

The moons of Jupiter are very brilliant; they lie in a straight line, crossing the middle of the disc transversely. These satellites were discovered by Galileo soon after he turned his newly invented telescope to the sky. They all suffer eclipse like the moon, and the phenomena they present is still a subject of much interest to the astronomer.

The effect of this grand array of brilliant spheres must indeed be exceedingly beautiful to the inhabitants, far beyond our finite comprehension; for if, on a cloudless night, we admire the silver radiance of our own moon, how much more would the beauty be enhanced if three other brilliant globes of light were to commingle their brightness at the same time?

We say inhabitants, because where a world exists *thirteen hundred* times larger than our own, lighted by a sun by day, and four brilliant moons at night, with all the other conditions necessary for the support of life, and yet placed at such a distance as to render it almost valueless to us as an illuminating body, we feel assured that the Great Architect intended that world as a receptacle for intelligent beings, endowed with all the faculties possessed by the human race—if not the residence of a higher order of creation, made to glorify their Maker in a more exalted and holy manner.

We are well aware that the idea of Jupiter being inhabited has been ridiculed by men whose narrow minds prevent them taking any very enlarged view of the Creator's power, on account of this planet's density being so different to our own, and they say, ironically, if there are inhabitants in Jupiter they must partake of a gelatinous character. Well, we see no objection to this remark, and what they offer in jest we accept in earnest. Let the inhabitants be gelatinous if they please. Have we so mean an opinion of the Omnipotent as to suppose that no intelligent beings can exist, except they are supported—as we are—by a gaunt and ugly skeleton, a frame-work or bird-cage of bone, hideous and repulsive to look upon? Sir Humphrey Davy considered the inhabitants would be composed of numerous convolutions of tubes, similar to the trunk of an elephant, whilst Professor Whewell fancied they must be pulpy creatures, like the jelly fish of our own seas. Sir David Brewster, however, although he offers no opinion upon the physical character of the inhabitants, still claims for Jupiter a race of intelligent beings, created to enjoy the magnificence and grandeur of this beautiful sphere.

Let us, however, suppose the inhabitants of Jupiter to be the gelatinous or pulpy creatures of Whewell and Davy—if they are intelligent, which we believe they must be—and could be told that on this little world—which to them must be simply a shimmering speck—people existed who could not stand upright without the assistance of a bone running through every limb, they would be as sceptical of our real existence as these doubters pretend to be of theirs, and, in all probability, they would place us amongst some such fabulous animals and hideous monsters as those with which our ancient mythology abounds.

The next planet we find careering through space is Saturn. This is by far the most magnificent of the whole group. Its distance from the sun is *eight hundred and ninety millions* of miles. It is attended by eight moons, and these satellites revolve round its mighty bulk in periods varying from twenty-two hours to seventy-nine days.*

Saturn is seven hundred times larger than the earth, it has a day of ten and half hours; but its year is nearly thirty times the length of ours, although it moves at the rate of *twenty-one thousand* miles in the hour in its circuit round the sun.

In addition to its moons, Saturn is encircled by several luminous rings and belts, the first being *thirty thousand* miles from the planet, and this has a breadth of *seventeen thousand* miles in its thickest part. These rings accompany Saturn in its revolutions; but neither the rings nor the moons can be seen by the unassisted eye; the distance indeed is so great that Saturn itself appears very small, whilst its light is exceedingly feeble and indistinct.

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* These moons are named, 1st, Mimas; 2nd, Enceladus; 3rd, Tethys; 4th, Dione; 5th, Rhea; 6th, Titan; 7th, Hyperion; 8th, Japetus.

Although this planet is deprived of a certain amount of the sun's radiance on account of its being so far from the centre, nevertheless its nights must be splendidly bright, its rings being almost as luminous as its moons, added to which it is just possible that what we call its night the inhabitants would call day, on account of its being the most brilliant portion of their time.

The next planet in the solar system is Uranus. It is seventy-four times larger than the earth, and its distance from the sun is so great that it takes eighty-four years to make its circuit. The exact length of its day has not yet been determined; but four moons have already been named, and these are called Ariel, Umbriel, Oberon, and Titania.* There is a strange peculiarity, however, attending the revolution of these satellites: they revolve from east to west, whilst every other planet in the solar system—whether primary or secondary—revolves round its central body in the opposite direction, namely, from west to east.

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* Many astronomers believe that Uranus has eight satellites, and we are inclined to the same opinion. In fact it is more than probable that, as Jupiter possesses eight moons, the more distant planets will be found to have larger families of satellites than have yet been discovered.

And still, beyond all these, away, away in the misty regions of space, comes Neptune, with a diameter of *thirty-three thousand six hundred* miles. Its distance from the Sun is *two thousand eight hundred and sixty-two millions* of miles; but, on account of its distant orbit, we are not furnished with so many particulars as we find recorded of the other planets in our system. In 1846, however, Neptune was discovered to possess one satellite or moon, which, Mr. Lassell says, revolves round the planet in five days twenty-one hours, and in all probability others will be developed, as our astronomical instruments become more powerful.

Having now travelled from the centre to the verge of our solar system—from the fount of light and heat to the pale quivering twilight that hovers round our distant spheres—let us shortly recapitulate a few of the most prominent features discovered in our journey.

In the vicinity of the Sun we found two globes, Mercury and Venus, with days and seasons, with oceans and land, mountains and atmospheres, like our own.

The next planet we encountered was the Earth, where we recognised the same general features necessary for life; but we found it larger and attended by a moon or satellite, and inhabited by a race of intelligent beings made to worship their Creator and rejoice in His glory.

Mars was the next orb we found in space; its mountains tipped with snow, its days of the same length as our own, and its pale green seas and coloured earth producing—even to the naked eye—that peculiar shimmer of variegated light found in the rays reflected from precious stones.

Beyond this, in space, we stood appalled, amid the wreck of an ancient world. There the fragments of an exploded planet revolved with the same precision as did the sphere of which they once formed a part; and the thought naturally occurred, as we viewed this field of ruin, may not some such fate attend this world of ours, and thus, by the liberation of the gases and the contact of other elementary matters, cause its destruction by fire?

But, as we proceeded onward, we next met the splendid orb Jupiter, riding majestically through space, attended by its queens in the shape of four brilliant moons. Beside this resplendent sphere our own planet lost its importance; but, as we gazed on that Goliath of the heavens, careering on with such silent grandeur, we were reminded that the philosophers of an early age, who thought our little world the centre round which all the other planets revolved, had not the magnificent instruments to examine the wonders of the celestial creation as the astronomers of the present day can command.

Still further on, and we reached that glorious orb Saturn, with its gorgeous belts and silvery moons, pursuing its distant path round the sun, and further on still—occupying the outskirts of the solar system—like gigantic sentinels keeping their lonely watch, Uranus and Neptune, attended by their satellites, revolving round that central fire from which all these floating worlds receive their light and heat; and whilst pausing there we felt bound to acknowledge the improbability of the Great Architect calling all these marvellous spheres into existence, and clothing them with such magnificence and glory, without some grand and specific end. We felt sure that Omnipotence would create nothing in vain, and as we have incontrovertible evidence that each and all the planets of our system are equal in beauty, and many superior in size and magnificence, to our own, we can come to no other conclusion—without travelling out of all logical reasoning—than that all the planets of our solar system, and all the other stars we see in space, have been, are, or will be, seats of intellectual life—homes for intelligent beings, in all probability higher in intellect than ourselves—beings created by the same Omnipotent power that called us into existence—units of some grand and stupendous plan of wisdom, beyond our finite judgment to comprehend.*

There are, however, two other spheres, which we must briefly notice, the Sun and the Moon; with the general appearance of these we are all familiar.

The Moon is the earth's satellite. In all probability it was formed by a fragment of the earth being detached whilst it was yet a plastic body of intensely heated matter, and before the first film of plutonic rock had enclosed the burning mass. The moon's distance from our globe is *two hundred and forty thousand* miles. She performs her journey round the earth in twenty-seven days, eight hours, and has a day nearly fourteen times the length of ours, and a night of the same duration. Her diameter is about *two thousand two hundred* miles, and it would take fifty such bodies to form a globe the same size as the earth.

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* An hypothesis has lately been started—and with some clever arguments in support of it—that it is just possible Jupiter and Saturn, Uranus and Neptune, are in themselves approximate suns; and that the satellites we perceive attending them are so many solar systems; but we are in a state of transition at the present time upon many important questions in astronomy, and we must not hastily adopt new theories until they have been satisfactorily tested by more than one competent observer. This, however, would not interfere with our argument, for should they ultimately prove to be suns, we still claim their satellites to be worlds, similar to the planet upon which we are now living, and that they have been, are, or will be the abodes of life.

The surface of the moon is exceedingly mountainous and rugged. It is covered with hill and valley, mountain ranges and deep gorges; extinct volcanoes and ponderous rocks present themselves as the surface is viewed through a telescope. Several maps of the moon have been made at various times, and in all there stands old "Tycho"—the most conspicuous amongst the mountains—with a diameter of forty-seven miles, and an altitude of *sixteen thousand* feet; but no trace of oceans or seas is discernible. So clear indeed is the atmosphere that its existence is still doubted, whilst its very transparency—if there is one—indicates the absence of any large quantity of water, although there may be sufficient moisture to support vegetation from small rivers or from copious deposits of dew.

Sir William Herschel, however, expressed an opinion which might be considered favourable to the moon being inhabited. His argument was that the peculiarity of its structure was no indication that it was without animal life, for as the Creator constituted man to walk upon the earth, fishes to swim in the sea, and birds to fly in the air, so the same creative power could form beings suitably constituted to inhabit the moon, and still enjoy the same pleasures of life we experience in this world of ours.

Herschel also believed he had discovered active volcanoes in the moon. The question, therefore, of an atmosphere of some kind, ought to be at rest, for we all know that without the influence of oxygen fire cannot exist, consequently, if Herschel saw the volcanoes in an active state, oxygen must also have been present to support the ignition, and although some doubts have been thrown upon Herschel's volcanoes, still so late as December 1st and 2nd, 1868, Professor Winlock reports a similar discovery. He says he not only saw an active volcano in the moon, but feels assured that other important changes are going on in this planet, for several well-known excrescences have entirely disappeared within the last few years.

It is not necessary, however, to people our satellite with intelligent beings, or, in fact, to believe that any of the satellites are seats of intelligence, to support the theory of our "Our Home in the Stars." We have our winters on earth, when vegetable life is checked; but when the spring comes round it wakes up with renewed vigour, under the genial influence of solar heat, and myriads of flowers sing the "Song of Summer and of Life." So also, in all probability, is it with the planets; they may have their long, long winters; when radiation has exhausted their internal heat they also may rest from producing life until some new condition—arising perhaps from chemical combination—calls into activity again the central fires, and then these cold dead spheres may once more become scenes of vitality and the homes of animal and vegetable life.

An article appeared some time since in several of the scientific journals—originally written by Stanislaus Meunier—which, although not new, nevertheless contains some curious speculations with regard to the present physical condition of the moon. His theory is, and he has the support of eminent astronomers like Beer and Arago, that the moon is a dead star. He draws this inference from a singular appearance upon the surface, which is called "grooves" by the physicists. These grooves have parallel sides nearly a mile in width, and from ten to one hundred and twenty-five miles in length. He has particularized already ninety of them, and it is supposed that more are in process of formation. Reasoning from analogy, he believes that at some period in the distant past the moon had an atmosphere and seas like those of our own globe, and also that, on account of her inferior size, she has cooled much more quickly than the earth. The water, he considers, was gradually absorbed as the decrease of internal heat increased the thickness of the crust, until long before the cooling process had reached the centre the seas had altogether disappeared. The sedimentary rocks solidifying, as the heat supply diminished, contracted in a manner resembling the appearance of basalt, and produced the grooves into which the atmosphere gradually settled. Hence comes the chaotic appearance of the moon, with its immense mountains, volcanoes, and craters; and although some astronomers are said to have detected the appearance of action in several of the volcanoes, his opinion is that they are mistaken, and that every vestige of organic life has long since departed from the surface of the moon.

This theory might not attract much attention when applied to our satellite; but we cannot shut our eyes to the startling fact that the earth is undergoing a similar process of transformation. Geologists trace a close resemblance between the circles in the moon and the circles of granite and porphyry upon the earth. They have discovered evidences of a fine stratification among the lunar mountains, while the volcanic formations bear a strong resemblance to many on our own globe.

Accepting this theory as correct, and we can see no objection to its adoption, the following is the process which is slowly taking place on the earth's surface, for she, like the moon, is gradually cooling. It is estimated that one-fiftieth of the original oceans has been already absorbed, and that when the crust of the earth has become one hundred miles in thickness every drop of water will have disappeared, for it has been calculated that the earth could easily absorb fifty oceans like those which now exist on our globe.

All the water at present on the earth constitutes only one twenty-four-thousandth part of its weight, and once absorbed the earth would crack like the moon, into similar grooves, into which the atmosphere would settle; but long before this era all life would be extinct.

There is, however, no immediate cause of alarm, for the process could not advance sufficiently to give the slightest record in the short span of a single life-time, or even in a century; and, according to the experiments of Bischof, it will take *nine million* years for the earth to cool down fifteen degrees below its present temperature; the loss of heat, then, in a century is almost imperceptible.

But if this is to be the process by which the earth and the moon are to die out, the same cause must produce the same effect in the other planets and satellites of the system. Even the great sun himself must be subjected to the laws which rule his subordinates. Consequently, the time must come in the distant ages of the hereafter when sun, planets, and moon, losing every vestige of heat, will not only have absorbed every drop of water, but they will have imprisoned every particle of atmosphere in the huge fissures of their crusts, and the solar system, now so grandly beautiful, will then be but an assemblage of dead worlds, without a ray of light, without a wave of heat, without a drop of water, without a breath of air, floating round in the immensity of space, bound together by the law of gravitation in the embrace of death.

It may not be a pleasing speculation, but it is certainly a philosophical one.

We now return to the centre we started, to view that glorious orb whence all our heat and light must emanate.

The Sun, originally thought to be only a globe of fire, is now generally supposed to be a solid ponderous body like our earth, but *one million three hundred thousand* times larger.

The heating and lighting apparatus of the sun consists of a luminous atmosphere, or rather a photosphere, or sea of fire, of intense brilliancy, and composed of various metallic and other elements in a state of highly attenuated gaseous combustion; and these flames emit rays of light, heat, colour, and electricity to all the other planets connected with the solar system.

In this luminous atmosphere there are several openings which are commonly called the spots on the sun, and it is through some of these cavities, or apertures, that the solid nucleus of the sun is supposed to have been seen.

Sir William Herschel was in favour of the sun's nucleus being a cool body; and he supports this opinion by assuming that between this photosphere, or sea of fire, and the body of the sun, there exists an atmosphere of vapour more dense than our own on a cloudy day, and this, acting as a screen from the light and heat of the sun, he says, would render the nucleus sufficiently cool to become the habitation of races similar to those of the earth. Modern investigation, however, does not support Sir William in this theory. The body of the sun is now regarded as an intensely hot globe; and, as some of our most learned professors—with the assistance of the spectroscope—are still investigating the physical characteristics of the sun, we shall, in all probability, soon hear a more elaborate solution of the matter. Brewster, however, inclined to the same theory as Herschel, and, in speaking of the sun, he says this luminary has many very important functions to perform, but its paramount duty is to control the movements and regulate the life of the various spheres of our system. It is the mainspring of the planetary chronometers, without which they would stop, or rush into destructive collision. It is the lamp which yields them the light without which life would perish. It is the furnace which supplies them with fuel, without which organic nature would be destroyed; "consequently," says Brewster, "we have every reason to believe that the sun is richly stored with inhabitants, though, possibly, the children of that planet may differ in organisation from ourselves, for universal life upon universal matter is an idea to which the mind instinctively clings. Kingdoms without kings, kings without subjects, continents without seas, ships without crews, and railways without trains, are contingencies as probable as solar systems without planets, or planets without people."

The spectroscope and photography have made us acquainted with many mighty secrets of the sun which appear almost incomprehensible to our finite minds, and could Brewster and Herschel have known what we can now witness every day, they would have formed a different opinion as to the characteristics of the sun. The symbols, however, have now been read, and the translation has been accepted by men accustomed to test scientific theories in a way which leaves little or no doubt as to their real value. An eclipse of the sun is now looked forward to with more interest than any other event in the scientific world. A thousand anxious watchers record every phase of the phenomenon, and then, by carefully comparing notes, results of such accuracy are arrived at that we can no longer dispute the correctness of their data. The eclipse of Dec. 22, 1870, added very materially to our knowledge of the "chemistry of the sun." It must, indeed, have been a grand sight. One of the observers at Gibraltar says, "As the moment of 'totality' approached, and the moon's shadow was preceptibly travelling across the sun's disc, he veiled his light more and more until the earth and sky began to assume a weird, unnatural aspect, and the effect was so solemn and fascinating that it was with painful anxiety one saw the dense clouds, with which the sky was widely covered, moving speedily from the west in the direction of the sun and threatening to hide the phenomenon from our sight. Heavy and looming, on they came, and at seven minutes before totality the view of the sun was completely lost. It was fortunately blowing hard. The friendly gale soon swept off the interlopers, and at about four minutes before the eclipse the brillant crescent again appeared. At 11h. 54m. 30s. (1½ minute before totality) the clouds having left a considerable space of clear sky, an extensive halo of deep shadow, with a faintly luminous fringe of prismatic rays, became visible. It was concentric with the sun, and in diameter about one third of the arc between the zenith and the horizon, seemingly about fifty times the apparent diameter of the moon's shadow. This halo, visible only for half a minute, was effaced by another cloud, which again obscured the view. After a minute's breathless anxiety the 'curtain again rose,' revealing the longed-for tableau. A grand, impressive sight presented itself through a rent in the clouds not greater in area than ten times that of the disc of the moon's shadow. That part of the opening which was above the eclipsed orb was clear like the sun at twilight, and in it were visible to the naked eye the planets Venus, Mercury, and half a dozen stars, the remaining part being covered with a thin haze. The moon's shadow appeared to the eye, assisted by a somewhat weak binocular glass, to be a dark circular disc with an even boundary of uniform shade. Within the corona, and touching the circumference of this shadow, appeared five or six spots of brilliant carmine, varying in form and size and at irregular distances apart. Two of these spots, or 'red flames' as they are called, on the eastern side of the disc, and at about fifty-five and eighty degrees respectively from the vertex, seemed decidedly the largest and most prominent; they were tongue-shaped and protruded about one-sixth the width of the corona. In their neighbourhood the corona was brightest and widest. There, too, the rays of the corona appeared to be gathered more distinctly into groups than elsewhere, faint shadows being visible between the groups. The corona consisted of beautiful rays of extremely faint prismatic hues, from the palest yellow, up through every tint of the solar spectrum; these rays at first sight appeared pretty evenly distributed all round, but closer examination seemed to detect the fact of there being bundles of rays in nearly regular groups. The width of the corona was about one-eighth the apparent diameter of the moon's shadow. It was very nearly concentric with the disc of the shadow; its boundary was well defined but 'jagged;' the perimeter—except opposite the two most prominent red flames above-mentioned, where the boundary slightly protruded—was circular."

With such a description as this we cannot wonder at the interest awakened in the minds of those who love to contemplate the marvellous wonders exhibited in the celestial world; and we can also find a thousand excuses for the fervour and zeal which lead enthusiastic men to people this dazzling sphere with beings equal to, if not higher, in intelligence than ourselves; but we must not sacrifice scientific truths upon the altar of our imagination, especially when there appears to be no longer any doubt on the matter.

Let us call to mind the fact that our own earth was myriads of years in preparation before it became the residence of man; let us bear in mind that several creations of inferior animals passed away before it was occupied by the present race, let us also remember that our original parents were created—comparatively speaking—a few thousand years ago,* and that millions of worlds were launched into space countless ages before our globe had gathered to itself the first few grains of its nucleus; and when we have reviewed all these phases of creation in our minds, the idea forces itself upon us, with the strength of conviction, that not only are the planets the abodes of life, but that thousands of those worlds —in ages too remote for calculation to enter upon—were inhabited by creatures similar to ourselves, and that, having fulfilled their destiny as a race, they were removed to other spheres, according to the degrees of happiness awarded them by their Creator.

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* We have, in reality, no actual data upon which we can rely to fix the precise time when man was introduced upon the earth. The antiquity of the human ace has been a subject of much controversy, and, although some of the greatest scientific men of our own age have discussed this subject with much earnestness, still no two can agree—within thousands of years—as to the period at which it might be said the human race appeared upon the earth. If a solution of this knotty problem should ever be arrived at, we have no hesitation in saying that it will be discovered amongst those imperishable vouchers which the fossiliferous rocks are continually yielding to our view.

Supposing this to be case, and we feel certain that all properly constituted minds will admit that we are not travelling out of the bounds of logical reasoning, what must be the joy and pleasure, the gratification and delight, experienced by those who, having passed their probationary state on this or some similar world, are now dwelling on those far distant shimmering spheres, where gorgeous suns are flaming in all the brilliant and vivid hues of precious stones? What glorious pictures can we not realize—even with our finite minds—if we conceive them, as seen through the prismatic rays which flow in continuous streams from those fairy coloured suns?

Let your fancy revel for a few moments over boundless oceans dashing their crested waves on rugged rocks, or rippling gently o'er velvet sands, strewn with pearly shells and bright fantastic weed; view that huge precipice, frowning and dark, that roaring cataract and playful cascade, those stalwart trees and marble fanes, those hills and valleys, powdered with myriad flowers; away in the distance see those glittering isles dotting the ocean's breast, sparkling with gems and liquid gold drawn from the dancing beams of a thousand suns; fancy, we say, all this scenery, illuminated with light of every shade and hue, trembling and blending from suns whose rays are gold and purple, topaz and garnet, emerald and ruby, sapphire and amethyst, and even then you will fail to realise even the faintest conception of the glories of those distant orbs, amongst which, we believe, will be found our future home.

Whilst preparing this work we were struck with the similitude which exists between the description of the heavens as given in Holy Writ, and our planetary system. In Scripture there is a distinct recognition of a plurality of heavens. We frequently read of the "seventh heaven," and occasionally we meet with the term "third heaven." Indeed, St. Paul speaks of being caught up to the third heaven, and there hearing unspeakable words, which it was not lawful for man to utter.

Now in our solar system we have seven planets, exclusive of the earth, revolving round the sun—Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune. May not our own globe be a nursery for the denizens of the other spheres of our system—a cradle for the human race—its battle field—its measured mile, where each quality is duly tested? May not each of the other planets be an abode for those who, having passed from this bourne, become located amongst kindred spirits in another sphere? May not our future happiness be progressive, and each globe—in our journey onwards—a resting-place, until, like silver seven times tried, we ultimately arrive, purged from the dross of sin, before the immediate presence of God? If, indeed, we were to say this was not the first time we have lived, we should only be putting into words thoughts which have occupied the attention of some of the deepest thinkers the world ever produced. Byron, Bulwer, Scott, Chalmers, and a host of other mighty men of genius, have all admitted in their writings, either by inference or by direct language, that they have experienced sensations which to them appeared to be glimpses of a previous existence —a recognition of scenes, hovering on the borders of that distant twilight where memory fades into nothingness, and shadows exhale like the morning dew. Indeed, it would appear that the veil which separates the past from the present is—for some inscrutable purpose—occasionally drawn aside, and that to some few permission is granted for their inner senses to go back and revel for awhile amid the hoary histories of a by-gone age, recalling to their minds visions of another life; and then each picture—like the fading photograph of some departed friend—wakes up recollections of pain and pleasure, time and place, intermingled with a weird fascination beyond the power of language to define.

But let us leave for the present this region of speculation and argument—this field of philosophy and science—and appeal more directly to that unerring tribunal by which all things can be judged—that book of universal reference, and see how far we are supported by that sacred volume which can be made to solve all doubts—in our belief that the planets are the abodes of life.

In the earlier chapters of Genesis we are made acquainted with the fact that angels existed before Adam was created. There we find that there are degrees of angelic beings—Cherubim and Seraphim, angels and archangels; indeed, the Scriptures are full of evidence as to the vast number of the angelic host and their variety. We read also of the great army of heaven and of legions of angels, but the Scriptures are silent as to their origin.

The creation of Adam, however, is fully detailed. We are told that he was made in the image of his Creator—a little lower than the angels; but still angelic in character, because he was sinless. Had not disobedience to the divine command lowered him from his first estate, in all probability Adam would still have occupied the earth with his numerous progeny as angels, whilst the world itself would have continued a paradise, increasing in loveliness and in beauty. Even with the curse of death hanging over him, Adam nearly reached his *thousandth* year before he died, and we have every reason to believe that, ere our first parents passed away, the Creator was reconciled to his creatures, and that, in that world of bliss which is to be the reward of the faithful, they may be now wearing those laurels of glory with which the elect are to be crowned.

Now is it not a fair inference to draw, that as men by faith may ultimately become angels of light, so the angels themselves, referred to in the early pages of the world's history, were in all probability once men, not necessarily fallen sinful men, but like our first parents in their innocency? We feel this to be even beyond a suggestive conclusion. It appears to us to be the only logical inference we can arrive at from the study of Holy Writ, for we cannot for a moment suppose our own race to be the first creation of human beings; globes, like our own, have rolled in space from the depths of a bye-past eternity, and we dare not suppose them to have rolled in vain.

The prophet Isaiah, whose inspiration is such lofty eloquence, and whose eloquence is such true poetry, says—"For thus saith the Lord that created the heavens, God Himself that formed the earth, He hath established it, He created it not in vain, for He formed it to be inhabited."

Now here we have the key to the whole question. The eye of inspiration detected the use and purpose of the globes and spheres by which we are surrounded. Our world would have been created in vain had it not been inhabited; consequently, as nothing was created in vain, all other planets—similar to our own—must have been, are, or will be, inhabited by some kind of intelligent beings, made not only to glorify God, but to enjoy the bounty and the beneficence of the Creator.

Dr. Chalmers, the Rev. John Pye Smith, Lord Brougham, the late Prince Consort, and a thousand other earnest Christians and deep thinkers have all speculated in the most reverend way upon what will probably be the character of our changed bodies, when we shall have shuffled off this mortal coil and become the tenants of "Our Home in the Stars." Consequently, we feel that we are not treading upon forbidden ground in dwelling for a few moments upon this, the deepest and most sublime subject that can engage the attention of the human mind. We do not ask our readers, however, to accept our ideas upon this subject; they are put forward suggestively only. Let those who cling to the *immateriality* of a future state continue to rejoice in its mysteries; but, for our own part, we fail to discover the slightest difference between the "immaterial theory"—which is nowhere supported in Scripture—and absolute nothingness. Our hope, our faith, and our expectations, are firmly and deeply rooted in the belief of a material heaven, where we shall enjoy the converse of material angels, and recognize our departed friends as the disciples recognized Moses and Elias at the transfiguration of Christ. In fact, there is abundance of evidence to establish the fact that our future bodies will be, to all intents and purposes, material bodies, although free from decay, disease, and death. We find quite sufficient in Scripture to warrant our taking this view of the subject, and upon what we find there must we argue, for science can throw very little light upon the matter. Man's finite judgment has hitherto failed to solve the mysterious problem. We must, therefore, fall back upon the proofs and inferences contained in Holy Writ, and endeavour to establish our proposition from what we there find recorded.

In that grand exposition, the 15th chapter of the 1st book of Corinthians, St. Paul says—"Behold I shew you a mystery; we shall not all sleep, but we shall all be changed, in a moment, in the twinkling of an eye, at the last trump; for the trumpet shall sound, and the dead shall be raised incorruptible, and we shall be changed."

Here, then, we are told that those who shall be found alive at the second coming of Christ shall be fitted for their new habitation by being changed. What a beautiful illustration is this of scientific principles! We know that, with our present physical organization, we could not pass twenty miles from our earth without every artery and vein—every muscle and limb—bursting from the rarified condition of the atmosphere at that height. St. Paul, therefore, knew that we must be changed before we could pass the bounds of our own atmosphere, and science has since proved what a correct view St. Paul took of the matter.

If, however, we were to pause here, how would the mind feel inclined to speculate upon what that change might be? We know that both Enoch and Elijah escaped the valley and shadow of death, that they were changed, and passed from this world to some brighter and happier sphere, without paying the penalty pronounced upon man; but what new beauteous form they took—what new glorified nature they assumed—still remains unrevealed. We can only recognize loveliness by what we see; we can only judge of beauty by our limited standard of form and outline; but in other worlds our graceful curves—our lines of beauty—our standards of the lovely—may be but eccentric angles, rude carvings, abortions of symmetry, or indefinable hieroglyphics, compared with the form and shape of those beings into whose likeness we may ultimately be changed.

Science, however, has assisted us thus far; it has shown us that even our present bodies cannot be *immaterialized.* If reduced to their ultimate atoms the compound materials would only be changed into their primary elements; we cannot annihilate them. The average weight of a man is *one hundred and fifty-four* pounds, and in popular language his body is said to be composed of bone and muscle, fat and skin; but take a human corpse into the laboratory, and submit it to an extreme analysis—put it into a crucible and char it to a cinder—dissolve it in caustic alkali—or do what you will with it—you cannot destroy it; you can only change its component parts. Let it rot in the grave for a *thousand* years, and then let its dust be consumed with fire, the ultimate simple elements will still remain—they are indestructible. The analysis of an eleven-stone man has been carried out, and the result proved that this corpse, weighing *one hundred and fifty-four* pounds, when resolved into its primary elements, had been composed of *one hundred and eleven* pounds of oxygen, *fourteen* pounds of hydrogen, *three* pounds *nine* ounces of nitrogen, *two* ounces of chlorine, *two* ounces of fluorine, *twenty-one* pounds of carbon, *two* pounds of calcium, *one* pound *twelve* ounces of phosphorus, *two and-a-half* ounces of sulphur, *two* ounces of sodium, *two and-a-quarter* ounces of potassium, *one hundred* grains of iron, *twelve* grains of magnesium, and *two* grains of silicon; and these are the natural elements of every human being in the world, without which no man or woman could exist, and which we are all carrying about in our living frames.

Thus, then, we are assured that our resurrection attire, under any circumstances, will be a material one; that we shall emerge from our earthly chrysalis in some new resplendent form of material beauty. Let us now see how we are further borne out in this ennobling and Scriptural view of our discussion.

In the 18th chapter of Genesis we find the patriarch Abraham entertaining three angels. They came with a message from the Almighty, and Abraham besought them to tarry awhile and refresh themselves. "Let a little water, I pray you, be fetched, and wash your feet, and rest yourselves under the tree: * * And Abraham hastened into the tent unto Sarah, and said, Make ready quickly three measures of fine meal, knead it, and make cakes upon the earth. And Abraham ran unto the herd and fetcht a calf, tender and good, and gave it unto a young man; and he hasted to dress it. And he took butter, and milk, and the calf, which he had dressed, and set it before them; and he stood by them under the tree, and they did eat."

Now, although for the most part the ancient fathers and more modern commentators are silent upon the fact that these angels were material creatures, with faculties, parts and passions, and material wants, similar to our own, we shall try and see how far we can reconcile their materialism with our theory of other inhabited spheres beside our own.

There can be no doubt but that these three celestial messengers were subject to material wants. They were refreshed by the washing of their feet—they partook of the banquet set before them by their host—they held converse upon the subject of the destruction of Sodom and Gomorrah, and two of them were subsequently entertained by Lot; consequently their physical constitution must have been similar to our own.

Now, having material wants, these wants must be satisfied by material means, and to be in possession of material means they must have a material source from whence to obtain them. They, therefore, were not immaterial spirits, belonging to some ethereal expanse—they were palpable angels, having form, figure, and speech —purified creatures—but still clothed with some kind of materiality, satisfying their hunger and cooling their feet by the same means as the patriarch would have used himself. Might they not have been the inhabitants of one of the many spheres we have been describing? Might they not have been three of the sinless ones of some previous creation, who, having passed their probationary state on a globe similar to our own, had "entered into the joy of their Lord," and were then engaged as ministering angels of His pleasure?

Another suggestion offers itself. Might not these angels have been beings actually belonging to our own earth, anterior to Adam, who, having accomplished their destiny on this sphere, were removed to another and more exalted orb, without passing the vestibule of death, and permitted to return as ambassadors to the scene of their former existence?

It does not necessarily follow that this early race of intelligent beings occupied any portion of the earth now enjoyed by the human race. We know that more than once or twice in the early history of the world the sea bottoms became dry land, consequently the land, with all its vegetable forms and animal life, must have been submerged. All the coal we are now exhuming was once lying at the bottom of the oceans beneath the sedimentary rocks then forming, but these bottoms were again lifted by volcanic agency—the irresistible power of the internal forces, steam and gas—and we now occupy them as our home in comparative safety. Consequently, we can form no idea of what revelation might be made by an examination of the various series of rocks now lying beneath our ocean beds. Geology has taught us much; but we must remember that our present dry land does not represent one-third of the surface of the globe, and that we have not examined even a hundredth part of that small portion. Up to the present time we have discovered no human remains in the fossiliferous rocks; but the day may come when we shall discover rocks crowded with signs of human occupation, but an entire absence of those animal forms with which, as we now call them, the Tertiary and Secondary rocks abound.

We know, so far as the human race is concerned, that death entered the world by the sin of Adam; consequently, if any race of beings existed on this earth previous to Adam, they were sinless creatures, and therefore escaped the penalty of death. It is still a favourite opinion, and strongly entertained by many, that a race of intelligent beings held possession of the earth long before the period assigned to the creation of Adam. This may indeed be true, and we believe such an hypothesis could be well supported by revelation; and if so, and that death did not enter the world until Adam's fall, then we can easily reconcile this theory with the absence of all human remains in the fossiliferous rocks, and also for the existence of angels at the period when our first parents were created.

Surely a material heaven appears to be more probable than the vague, unsatisfactory, unsubstantial idea we have of that elysium in space, generally understood as our future home, but so feebly described by those who attempt to pourtray its beauties. The fact is, because a being, state, or thing is invisible to us, we are very apt to confound it with the immaterial; but there is not the slightest connection between the two. The air is invisible, but it is also material. Its powers when exerted are terrific. In its paroxysm of storm it can desolate cities and strew the surface of the earth with ruin. The deep roll of the distant thunder proclaims its power and materiality, but still it is invisible. It is, therefore, quite possible for our heaven and its occupants—the disembodied spirits of men and angels—to partake of a materiality as sure and as certain as the air by which we are surrounded, or the still more subtle element—the luminiferous ether of the universe—and thus be absolutely invisible under the present conformation of the optic nerve.

Indeed, we have a right to believe in a material future, and that, as angels, we shall be material beings, when we have so many Scriptural assurances that such is the fact. David, when recounting the dealings of God with the Israelites, in the 78th Psalm, speaks of the manna rained down from above as angel's food. Then we hear of the various occupations of the angels, each and all requiring intelligence of a far higher order than that possessed by man; of the angel Gabriel, who was commanded to fly swiftly, and he outstripped the velocity of light, for he reached the prophet Daniel before his prayer was ended. Then there was the destroying angel, who slew in one night *one hundred and eighty-five thousand* men of the Assyrian army. Then, again, to show that they are not only material beings, high in intelligence, but that they can exercise the attribute of omniscience, we find another going through the land of Egypt, and discriminating the first-born from all others, and slaying them according to the word spoken to Moses. Then one of the celestial beings rolled away the stone from the mouth of the sepulchre, and another released Peter from prison, showing that they must also possess considerable physical powers. Some are said to excel in wisdom and some in strength, whilst all these faculties and powers must be dependent and conditional on some kind of material existence. We cannot, therefore, close our eyes to the fact that our heaven will be a material heaven, and although we may become angels of light, still we shall possess a materiality which can only be supported by material means.

That the present world will be destroyed is certain—it is to be consumed with fire, and all that therein is will be burnt up. In fact, according to the opinion of many learned men, the prophecies are fast being fulfilled, and we are rapidly approaching that final catastrophe when we must pay the penalty of all creation. We know that a previous world belonging to this group has been destroyed: we point to that desolate region between Mars and Jupiter, we look at those mighty fragments still careering round the sun as evidence of the truth that we shall not escape the Creator's fiat and the general doom.

From the earliest nucleus of an embryo world, when but a few grains of star-dust are accumulated, down through the myriads of ages it revolves in space, attracting and accumulating the elements of matter, which will ultimately be condensed into a globe; and from that time, onwards and on, until the Spirit of God moves upon the face of chaos, and impregnates the womb of matter with life, and still on, through all its various creations down to its destruction —all, all, is progress and change; each phase in its history and each step in its career hurries it on to the end.

From the first germ of life developed on these spheres, to their full equipment with intelligent beings, all is progress again. These beings run their race, they fulfil their appointed embassy and die; but progress cannot be checked by death. We only commence a new starting point; consequently, the very angels who talked with Abraham and Lot might well have been originally the tenants of this or some extinct world, working out their ultimate glory by progression through successive spheres.

Revelation tells us of a time when these starry worlds were hot—when the planets and suns we now behold glittering in the vast profound of space had not been added to the Great Architect's design. Whether their formation was gradual or otherwise, we can only judge from analogy; but we are informed that "He made the stars also," and even since the Christian era there are several instances on record of the sudden appearance and disappearance of stars of unusual magnitude and beauty.

In 1572 a very brilliant star suddenly became visible, so lustrous, indeed, that it could be observed at noon-day; it disappeared after a visit of sixteen months, and many astronomers suppose this star to have been the destruction of a distant world by fire.

In the year 1804 another new star, of surpassing brilliancy, appeared in the heavens. This star continued to change into all the vivid colours of the prismatic rays. In its vicinity the heavens were blazing with splendour. It has been computed that the light was equal to ***twelve hundred thousand*** of our worlds wrapped in one mass of flame. In fact, if the whole of our solar system were converted into one vast sun, it could not surpass in brilliancy and splendour the star to which we refer; whilst so late as May, 1866, a similar phenomenon occurred.

Now as these stars shone forth with such a sudden light, and as abruptly disappeared, and continued to change their colour as long as they were visible, the only interpretation that can be given of their appearance is that they were worlds like our own, in a state of conflagration. Were it possible to witness this globe in a state of active ignition, the minerals in its crust—its gold and silver—its copper and iron—its sulphur and lead—would produce all the variously coloured flames noticed in these ephemeral stars. And as this earth is to be consumed by fire, so in all probability have others perished by the same means.

Within the last century several stars, in different constellations, have totally disappeared, and others have been created, so, as resurrection follows death, creation follows on the heels of destruction continually.

The axiom that every pleasure has its penalty, and every happiness its alloy, is painfully exemplified in the fact that modern astronomical discoveries have led to the inference that our glorious planetary system—even should it escape destruction by fire—will eventually fall into collision, and consequently come to absolute and certain ruin.

Although there has been much discussion on the subject, it is now generally admitted that in space there is a resisting medium, with the nature of which we are only partially acquainted; but we know from repeated calculations that this medium, or ether, materially interferes with the motion of the heavenly bodies—that Encke's comet, which makes its appearance by revolving round the sun every three and a-half years, has been so far retarded that it has actually advanced nearer the sun by several days in its approach than can be accounted for by the laws of gravitation.*

If, then, this comet upon which these observations have been made is retarded in its progress, so also are the planets of our system, and although the distance of time must necessarily be great before the nearest can come into collision with the sun, nevertheless, so unerring are the laws of gravitation—so imperative are the commands of Omnipotence—that, if these astronomical calculations are correct, the day must eventually arrive when inevitable and uncompromising ruin must ensue. But to return to "Our Home in the Stars."

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* Professor Hall considers there must be some error in Encke's calculations, and in the *American Journal of Science and Art* he suggests that they should be revised.

Nehemiah, in his 9th chapter, says—"Thou hast made heaven, the heaven of heavens, with all their host, * * * and the host of heaven worshippeth thee." Now, as the planets themselves cannot perform an act of adoration, the prophet must have alluded to the inhabitants of these spheres, who, in common with ourselves, worship the great Creator of all.

St. Paul also says, "The worlds were framed by the word of God." Here we have the plural sufficiently distinct to show that other spheres beside our own are referred to by the Apostle, for, had he not intended to convey the idea that other worlds existed, he would have spoken of them by their more generally accepted name of "stars."

But, beyond all this, we have higher testimony —a more secure basis—than the words of the prophets, or the teaching of the apostles, to rest upon. We have the declaration of their Master; we rely upon those emphatic words of our Saviour, when he was comforting his disciples shortly before his betrayal—words which must ever rise paramount in our minds when discussing such a sublime subject as the present. "In My Father's house are many mansions: if it were not so, I would have told you. I go to prepare a place for you." What language can be more expressive? What declaration can be plainer? Why should we strive to bolster up our argument by philosophical deductions, by astronomical inferences, and by human platitudes, when we have the Saviour of these very worlds declaring that there were other mansions than this, and in one of those mansions He was going to prepare a home for us, on our removal from this, the scene of His condescension and love? Does not this say "The whole universe is 'My Father's house,' the stars and the planets are the mansions thereof"? To one or the other of those distant worlds must our Redeemer have referred when these memorable words were spoken.

How this illustrates our hypothesis of a material heaven! There are other mansions than ours—other homes in the universe than our little world—each and all teeming with intelligent beings, enjoying their Creator's bounty, bowing in adoration before His glorious Majesty, and singing hallelujahs to His praise.

To conceive this one globe as the only inhabited sphere, is virtually to throw a doubt on inspiration—to say in other words that throughout all time, back through all the interminable depth of past ages, until *six thousand* years ago, the Creator stood alone in His immensity, with no terrestrial beings to care for, with no one to lift the eye or bow the knee on all those rolling orbs—that there was not a plant or animal in all space, and that this and all other spheres, up to that period, were created in vain—that our sun and all its magnificent attendants, the planets and all their glorious orbs, were rolling uselessly in space, the mere playthings of time and the baubles of eternity, lighting nothing, warming nothing, cheering nothing, but performing a wearisome journey, and presiding over an empire where no prayer ascended, no sacrifice exhaled its perfume, no hymn rung out its praise; but where universal silence and chaotic death prevailed. Such things cannot be!

If the worlds were not created for life they were created in vain—and that we dare not admit. Wherever we see matter, whether the distant twinkling star or the mighty ocean, the mountain peak, or the yawning mine, in earth or in air, there we see life. Matter and life are inseparable—it is a universal law—and by a decree of that Framer of universal laws it must for ever remain the same.*

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* Dr. Mann, in his "Guide to Astronomical Science," strongly supports the theory of the planets being inhabited spheres. He says, "In the arrangement of the earth, the atmosphere is obviously provided for the production of organisation and the support of life. It is the great reservoir out of which the material of vital

When we say life, however, we do not necessarily mean intelligent beings. The series of creations which took place upon this earth, before it was capable of receiving the human race, would naturally lead us to suppose that each of the planets would be peopled in the same way. We believe in the development theory, but not to the extent of Darwin. We believe in progression by natural selection, and that the weaker races must perish by the laws of condition; but we cannot accept the ultimatum to which Dr. Darwin would lead us. We are bound to believe in creation by law, because

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structures is taken. It is the intermediate link which connects vegetable and animal existence, and which adapts each to the other. It is the great exciter of all animal activity. Wherever air is, life appears. Wherever air is excluded, life is destroyed On this account all man's experience leads him to associate atmosphere and vitality inseparably together. If an observer looked out into space and saw at a distance a sphere with green trees growing on it and animals walking about, he would at once infer that air must be present also. But observers do look out into space and see remote spheres with traces of atmospheres rolled around them, consequently, by the simple reversal of the process, they must believe in the presence of living beings where they perceive air. Science has nothing positively to found a conclusion upon; but probability is altogether on the side of there being a plurality of inhabited worlds in the universe. The great Author of nature

Holy Writ tells us it was so in the beginning, and science has since proved it to be correct. We must not allow the words "creation by law" to alarm us; we believe them to be perfectly orthodox. When the earth had cooled down sufficiently to permit animal life to exist, then we are told that on the fifth day, or during the fifth period of the world's history, the Creator commanded the waters to bring forth abundantly the moving creatures that have life, and the waters brought forth abundantly; consequently we here see that the first dawn of animal life was ushered in by a command, a fiat, or, more properly speaking, by a law; and what was this

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has obviously shown a great anxiety that the sphere which is within the reach of man's direct observation should be teeming with life. He has so crowded the terrestrial surface with species and generation superadded to generation, that it is improbable in the highest degree He should have left desolate and void other regions of the same creation, which are so much wider than the earth in extent, and which are based upon the same kind of substantial matter, and bask in the same general and vitalising sunshine. It does not, however, necessarily follow that the inhabitants of the various planets should correspond with those of the earth. It is most likely that there is an endless variety of form and organisation amongst the spheres, and that each planet has its own especial series of created beings adapted to its specific peculiarities of structure, constitution, and situation."

animal life? It was just that which the conditions of the earth at that precise time permitted to exist—the vivified germs of a few sea-slugs and a few sea-worms. But, as the conditions of the earth changed—as the temperature became lower—so development and progression kept pace with the altered conditions, until the world became stocked with that variety of animal life which we find occupying the various platforms of the fossiliferous rocks, and the more modern creations which now enjoy life with ourselves. But not only were the marine tribes created by law, but the earth was commanded to bring forth vegetation and the beasts of the field, just at the very time when the conditions of the earth were most favourable for their development; yet there was neither fiat, command, nor law, to usher man into the world. All before had been the calling into life of creatures actuated only by the common instinct of self-preservation; but now that intelligence was to be enthroned in the world, and made to occupy the highest platform of life, an especial act of creation was inaugurated, for God no longer called upon the waters to bring forth, nor the earth to yield up; but the Omnipotent said "Now let us make man in Our Own image," so that, however development might have assisted in producing the various links in the chain of the lower animals, here was a new starting point—here came the first link in a new chain, the chain of intelligence, the Alpha of a new dynasty, the miracle of creation—MAN—not as we see man now, for we can have no conception of that glorious being, the first man, as he came fresh from the hands of the Creator, standing face to face, and holding sweet communion with his God. If, however, we encourage this train of thought, we shall wander far from our subject, and trench upon irrelevant matters.

As we have already referred to the destruction of worlds, we feel inclined to say a few words as to one particular theory of the creation of worlds, which we thoroughly endorse. Comets are of two kinds—those with a nucleus in the head, and others wholly composed of mere attenuated gas—a luminous impalpable vapour or conglomerate of starry molecules, sublimated, as it were, into a kind of fiery haze. Those few who possess a solid nucleus are also surrounded with an atmosphere of gas, luminous mist, or attenuated nebula, and, in common with the others, possess the appendage of a brush or tail.

These remarkable visitants occupy the universe in countless millions, and attract much attention when visible to the unassisted eye. In them we see, as it were, the "spawn" out of which suns and planets, stars and systems, are made. Large comets devour smaller ones, as they come within their influence, and they also gather to themselves, as they sweep their orbit, the various elementary gases found in space.

That a vast majority of the comets are without condensed heads can be very easily proved, as the stars can be seen through them, whilst instances are upon record of some few having a nucleus sufficiently dense to block out the light of the stars they pass over.

Now this theory supports the idea that many of those entirely composed of vapour or gas rapidly approach in their circuit the suns round which they revolve, until they ultimately fall into their luminous photospheres, and become absorbed, thus sustaining the heating and lighting properties of the various suns.

Those, however, possessing a solid head, are supposed to become more and more condensed by attracting nebulous and elementary matter as they rush through space, until they form the nuclei of embryo worlds, and gradually become, by radiation, gravitation, and time—that is to say, *millions* and *millions* of years—globes similar to our own.

Even these are gradually approaching the centre round which they revolve; but the more they are condensed the less resistance they meet with from the ether through which they travel, and consequently their approach to the sun is so imperceptible that no calculations have yet been made of their variations.

Sir Isaac Newton, however, appears to have been strongly impressed with an opinion that the various suns would ultimately absorb all comets coming within their influence. At the age of eighty-three he held a conversation with his nephew on this subject, the substance of which is recorded.

"I cannot tell," said Sir Isaac, "when the comet of 1680 will fall into the sun; but according to my calculation, it will do so after five or six more revolutions; and when that catastrophe takes place the temperature of the sun will be raised to such an extent that this world and all others whose orbits are not more distant than our own, must take fire, and all they contain will inevitably perish." May not this event bring about the fulfilment of Peter's description of the destruction of the world, when he says "The heavens and the earth, which are now, * * are kept in store, reserved unto fire against the day of judgment?"

But once more to return to our subject. Men of the highest authority in biblical and scientific research agree that the planets must be inhabited spheres. They all hold to the fundamental principle that where matter exists life must be abundant. Sir David Brewster says, "The best illustration of the subject, from analogy, is to suppose a philosopher contemplating from a distance the bodies of our solar system, and wholly ignorant of their condition. He examines them so as to acquire all the knowledge we possess of their size, the influence they receive from the sun, and all the phenomena disclosed by the telescope. He knows nothing of their being inhabited or uninhabited; but, being permitted to visit our earth, he finds it peopled, and he scrutinizes the relations which exist between vegetable, animal, and intellectual life; the influences which emanate from the sun and moon, the days, nights, and seasons; and the atmospheric changes which characterize our globe. He again takes his place at a distance, and pondering over all the spheres in our system, he at once concludes that they must be all inhabited like our earth; but, had he first visited Jupiter, with its gorgeous magnitude and numerous satellites, and found that inhabited, he might have conceived it possible that, as the monarch of all our planets, Jupiter alone enjoyed the dignity of being the seat of life; but at the same time, the force of analogy would have compelled him to view the whole solar system as one grand material scheme, planned by its Creator as the residence of moral and intellectual life."

To those who delight to contemplate such a glorious subject as the creating and sustaining power of the Omnipotent, how much real pleasure can they extract from the study of the heavens and from the various phenomena which take place on our own globe!

Day and night, with all their atmospheric variety, equally open up fresh beauties; not a cloud can pass over the disc of the moon, not a vapour can dim the brilliancy of the sun, not a shooting star can cross the silver-spangled vault, not a storm can gather, or a thunder cloud burst, but the thought will occur—as we view the planetary worlds—in which of those glittering orbs shall we find our future home, and how will all these beauties be enhanced when we shall be eliminated from the dross which now chains us to our mother earth?

With a healthy mind and a heart at peace, all material nature brings sensations of delight. Spring, with its bursting beauties, birds caroling and blossoms breaking, embryo leaves and infant flowers creeping forth to welcome the genial sun—the glorious paradise of Summer, when orange blossoms scent the air, and myriad flowers scatter their incense and perfume on the zephyr's gale—Autumn, with its ruddy fruit and golden corn, hill and valley, glade and dell, laughing in their robes of plenty—stern Winter, with hoary beard and leafless trees, draped in snowy garniture and glittering ice—all, all tend to bring back the thought—in our future home how will all these pleasures be increased! Shall we not there find new joys, new hopes, new forms of beauty, new colours and combinations, new materials for praise, and more holy aspirations than it is possible for man, in his natural state, to contemplate even in thought?

Even here nature has been most prodigal in her supply of blessings. No want has been left unprovided for; the storehouse of plenty is inexhaustible. However much we may suffer from bodily ailments, still there is a large balance left in favour of happiness. Even here our pleasures are real, provided we do not prostitute their use; but rich as our provision may be, beautiful and enchanting as our temporal inheritance may become, lofty and spiritual as our aspirations may rise, they sink into insignificance when compared with the happiness and bliss promised as a reward to the righteous. Who can tell the beauty, the love, the gorgeous associations, the intellectual pleasures, the deep thrilling sensations, the grand developments, or the ecstatic joys, that await us in that star which is to become our future home. And as "one star differeth from another star in glory," so will our future happiness be apportioned—whether we shall occupy the outskirts of heaven, or rejoice in the immediate presence and glory of God.

We are now of the earth, earthy. All our ideas, all the combinations of our mind, all the floating theories of our brain, all the conceptions of our imagination, all our longings and desires, are tainted with earth. We may soar with the eagle, we may fly with the pinions of thought to other spheres, we may delight in the contemplation of the sublime and the beautiful; still we are wedded to the earth. We cannot, with our finite minds, grasp the infinite; we still grovel on, clogged by our mundane hopes and our mundane fears, and we utterly fail to reach that elevated point in thought, from the pinnacle of which we might contemplate the unmixed pleasures of heaven.

But in conclusion—in the beautiful writings left us by that favourite disciple John—writings so full of love, tenderness, and pathos—we find it recorded that our Saviour, when describing Himself as a Shepherd, said—"Other sheep I have, which are not of this fold: them also

I must bring, and they shall hear My voice; and there shall be one fold, and one Shepherd."

This remarkable passage—to our mind—points significantly to the ultimate gathering together of all the elect, from all globes, and from all spheres, when the hierarchy of God's chosen people shall be complete in our future home, and bright winged seraphs shall sing "Great and marvellous are Thy works, Lord God Almighty." But, as if to assure us that that home will be some glorious clime, that it will be a material home—some new paradise, where the thorn and the briar shall be unknown—some radiant orb, where night shall no more close its sable wings, but bright ethereal spring for ever reign; as if to give us some slight glimpse of those mysterious changes of character and physical constitution which will attend our introduction to a future home, our Saviour has left behind Him such encouraging words as may well prove a solace and comfort to those whose hopes are fixed on a material heaven. No matter whether poverty or disease, bereavement or misfortune, have been breaking our cisterns and withering our gourds; whether we are tempted to murmur at God's dispensations or fancy we are forsaken in the world; these glorious words must ever bring a holy calmness to our mind, for they point to a future home where all our mundane trials and sorrows will be absorbed in the beatitude of God's glory and love for ever.

After His last supper, and just before our Saviour went up to the mount of Olives, He said to His disciples, "Verily I say unto you, I will not drink henceforth of the fruit of the vine, until that day when I drink it with you in my Father's kingdom." We claim the right of taking these words as literally as we believe they were intended; but in what particular star that kingdom will be found it is not for us to inquire. Sufficient for us to know that our Saviour has gone before to prepare for us a home amid those starry wilds where "the noble army of martyrs" and "the glorious company of the apostles" will greet our coming, and where a myriad of golden harps will swell in exulting harmony, and the morning stars will once more sing for joy; and when these sacred pœans shall rise like clouds of incense around His holy throne, may we hear with bounding hearts that thrilling welcome promised to those who shall have fulfilled their trust, "Well done, thou good and faithful servant: * * * enter ye into the joy of your Lord."

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NOTE TO PAGE 30.

We are indebted to Mrs. Galvani, the wife of Dr. Galvani, for the accidental discovery of the effects of galvanism on the muscular tissue of animals, and was one of the doctor's pupils, who afterwards became a Professor of Natural Philosophy in France, that obtained permission to experimentalize on the bodies of some criminals executed for murder. This was before the guillotine became the recognized instrument of death, when criminals were hanged, but in such a disgraceful, cruel, and clumsy manner, that Dr. Guillotin suggested the use of this instrument for the purpose of carrying out the sentence of death in a more merciful manner. Although this instrument is called after Dr Guillotin's name, still he must not be considered the inventor. So early as the year 1555 a similar instrument was used in Italy for the execution of criminals, and afterwards introduced into Scotland by the Regent Morton, and, strange to say, he was himself decapitated by the same instrument. It was then called "The Maiden." It was also used at Halifax, in England, during the reign of Elizabeth, under a special Act of Parliament, for the punishment of criminals convicted of stealing woollen cloth to the value of *thirteen pence halfpenny*. But these instruments were very clumsy affairs before Dr. Guillotin improved the machinery and made them what they now are, the most merciful instruments of death used throughout the civilized world.

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